

B7



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

09/928,049

08/13/2001

Doron Gamliel

967X

6949

7590

12/28/2004

Kevin Redmond
6960 SW Gator Trail
Palm City, FL 34990

EXAMINER

HASHEM, LISA

ART UNIT

PAPER NUMBER

2645

DATE MAILED: 12/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/928,049

Applicant(s)

GAMLIEL, DORON

Examiner

Lisa Hashem

Art Unit

2645

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 August 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3, 5-14 and 22-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-14 and 22-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-3, 5-7, 8-14, 22-23, and 24, are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,854,974 by Li in view of U.S. Patent No. 6,278,872 by Poulin et al, hereinafter Poulin.

Regarding claim 1, Li discloses a double balanced mixer for mixing an RF input signal with a local oscillator signal to provide at an output an intermediate frequency signal (see Abstract and Figure 3), comprising: (a) a first diode ring (Figure 3, 104) having a first and second input port for receiving the local oscillator signal and a third input port for receiving the RF signal, the first diode ring further having a first output port for providing the intermediate frequency signal; (b) a second diode ring (Figure 3, 108) having a fifth and sixth input port for receiving the local oscillator signal and a seventh input port for receiving the RF signal, the second diode ring further having a third output port for providing the intermediate frequency signal; (c) a first balun connected across the first and second input ports and the fifth and sixth input ports for receiving the local oscillator signal (Figure 3, 114); (d) a second balun connected to the third and seventh input ports for receiving the RF signal (Figure 3, 118); and (e) first and second compensation inductors (Figure 3: 150 and 152) connected to the first and third output

Art Unit: 2645

ports for compensating for the parasitic capacitive reactance developed by the diode switching elements within the first and second diode rings (column 4, lines 6-62).

Li does not disclose a third balun connected to the first and third output ports for providing the intermediate frequency (IF) signal.

Poulin discloses a frequency converter with improved linearity double balanced mixer for mixing an RF input signal with a local oscillator (LO) signal to provide at an output an intermediate frequency signal (see Abstract), comprising; (a) a first or LO balun (Figure 3, 214) connected for receiving the local oscillator signal (Figure 3, 225); (b) a second or RF balun (Figure 3, 220) for receiving the RF signal (Figure 3, 220); (c) four identical MESFETs (Figure 3: 202, 204, 206, and 208) each having output ports for providing the intermediate frequency signal; and (d) a third balun (Figure 3, 212) connected to the output ports for providing the intermediate frequency signal, the third balun having a fifth transformer and a sixth transformer (column 4, line 44 – column 5, line 49).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the double balanced mixer of Li to include a third balun as taught by Poulin for providing the intermediate frequency signal. One of ordinary skill in the art would have been lead to make such a modification since including a third balun by the output port would extend the operating frequency range of the mixer and for providing the intermediate frequency signal. The third balun can include a fifth transformer that has a ninth and a tenth winding and a sixth transformer that has an eleventh and a twelfth winding (wherein Li teaches each balun has two transformers each with two windings; see Figure 3).

Regarding claim 2, the double balanced mixer according to claim 1 mentioned above, wherein Li further discloses the first balun (Figure 3, 114) includes a first transformer that has a first and a second winding and a second transformer that has a third and fourth winding (Figure 3: 142, 144).

Regarding claim 3, the double balanced mixer according to claim 1 mentioned above, wherein Li further discloses the second balun (Figure 3, 118) includes a third transformer that has a fifth and a sixth winding and a fourth transformer that has a seventh and an eighth winding (Figure 3).

Regarding claim 5, the double balanced mixer according to claim 1 mentioned above, wherein Li further discloses each diode ring comprises: a) a first diode having an anode and a cathode; b) a second diode having an anode and a cathode, the cathode of the first diode connected to the anode of the second diode; c) a third diode having an anode and a cathode, the cathode of the second diode connected to the anode of the third diode; and d) a fourth diode having an anode and a cathode, the cathode of the third diode connected to the anode of the fourth diode and the cathode of the fourth diode connected to the anode of the first diode (see Figure 3: 104 and 161-164 and Figure 3: 108 and 171-174).

Regarding claim 6, the double balanced mixer according to claim 1 mentioned above, wherein Li further discloses parasitic elements of the local oscillator signal are inherently cancelled in the second and third baluns (column 4, lines 28-62).

Regarding claim 7, the double balanced mixer according to claim 1 mentioned above, wherein Li further discloses isolation between the local oscillator signal and the RF and intermediate frequency signals is inherently increased (column 4, lines 28-62).

Art Unit: 2645

Regarding claims 8, 13, and 14, please see the rejection of the double balanced mixer in claims 1, 6, and 7 mentioned above, respectively, to reject the double balanced mixer in claims 8, 13, and 14.

Regarding claims 9 and 10, please see the rejection of the double balanced mixer in claim 5 mentioned above, to reject the double balanced mixer in claims 9 and 10.

Regarding claims 11 and 12, please see the rejection of the double balanced mixer in claims 2-3 mentioned above, to reject the double balanced mixer in claims 11 and 12.

Regarding claims 22 and 23, please see the rejection of the double balanced mixer in claims 1-3 mentioned above, to reject the double balanced mixer in claims 22 and 23, wherein Li in view of Poulin further discloses the third balun or intermediate frequency balun including a first transformer with a first winding and a second winding and a second transformer having a third winding and a fourth winding (see Li: Figure 3 and see Poulin: Figure 3).

Li discloses the LO balun and RF balun (Figure 3: 114, 118) that includes two transformers with two windings each (see Figure 3). Also, Li discloses two diode rings that are located by the RF balun (Figure 3, 104, 108).

Li does not disclose an IF balun.

Poulin the intermediate frequency balun (Figure 3, 212) is located by the RF balun (Figure 3, 210) (Poulin: Figure 3). The first winding connected between the radio frequency balun and the first MESFET (Figure 3, 202), the second winding connected between the second MESFET (Figure 3, 204) and the output port (Figure 3, 235).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the double balanced mixer of Li to include a third balun as taught by Poulin

Art Unit: 2645

for providing the intermediate frequency signal and having the third balun located between the set of diode rings and the RF balun. One of ordinary skill in the art would have been lead to make such a modification since including a third balun by the output port would extend the operating frequency range of the mixer and for providing the intermediate frequency signal. The third balun can include a fifth transformer that has a ninth and a tenth winding and a sixth transformer that has an eleventh and a twelfth winding (wherein Li teaches each balun has two transformers each with two windings; see Figure 3), The IF balun with the modified circuit of Li in view of Poulin includes the IF output port IF coupled to the junction of diodes D1, D4, and D5, D8. The third winding connected is between the first diode ring and the output port and the fourth diode ring is connected between the second diode ring and the radio frequency balun (see combination of Li in view of Poulin).

Regarding claim 24, please see the rejection of the double balanced mixer in claims 1-3 mentioned above, to reject the double balanced mixer in claim 24, wherein please also see the rejection to claims 22-23 above. Li in Poulin when combined disclose a LO, RF, and IF balun, each with two transformers and two windings. Wherein, the diode rings are connected to the windings in a significant order to mix the local oscillator signal and the RF signal to produce the IF signal.

3. Claim 25, is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,854,974 by Li in view of U.S. Patent No. 6,278,872 by Poulin, as applied to claim 24 above, and in further view of U.S. Patent No. 3,913,037 by Himono et al, hereinafter Himono.

Regarding claim 25, the double balanced mixer according to claim 24 above, wherein Li

Art Unit: 2645

further discloses the second (Figure 3, 142) and sixth (Figure 3, 136) windings each have an end that is connected to ground.

Li does not disclose both windings each having a pair of ends that are connected to ground.

Himono discloses a broad band balanced modulator with a signal input side and a signal output side comprising a first transformer means (Figure 3, 1) on the signal input side (LO signal) including two transformers with two windings and a second transformer means (Figure 3, 1') on the signal output side including two transformers with two windings (see Abstract; Figure 3). Wherein, the second winding in the first transformer means and the sixth winding in the second transformer means each have a pair of ends that are connected to ground (near Figure 3: 7, 7'; column 4, lines 16-32).

Response to Arguments

4. Applicant's arguments, see Amendment, filed August 27, 2004, with respect to the rejection(s) of claim(s) 1-3, 5-14 and 22-25 under Li in view of Will have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Li in view of Poulin for claims 1-3, 5-7, 8-14, 22-23, and 24 and Li in view of Poulin in further view of Himono for claim 25.
5. Examiner acknowledges withdrawal of the title objection in the Office Action filed, June 30, 2004. The new title is accepted.
6. Accordingly, this action is **NON-FINAL**.

Art Unit: 2645

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

- U.S. Patent Application Publication No. 2002/0032016 by Ji discloses a double balanced mixer for mixing a RF input signal with a local oscillator signal to provide at an output an intermediate frequency signal with a high third order intercept point
- U.S. Patent No. 5,774,801 by Li et al disclose a double-double balanced mixer that includes first and second RF baluns and first and second LO baluns connected to two diode rings

8. Any response to this action should be mailed to:

Commissioner of Patents and Trademarks
Washington, D.C. 20231

Or faxed to:

(703) 872-9314 (for formal communications intended for entry)

Or call:

(703) 306-0377 (for customer service assistance)

Hand-delivered responses should be brought to: Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lisa Hashem whose telephone number is (703) 305-4302. The examiner can normally be reached on M-F 8:30-5:30.

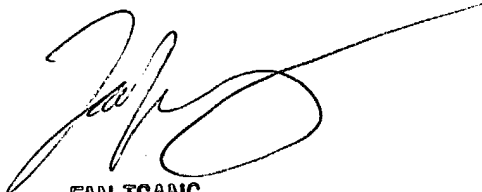
Art Unit: 2645

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Fan Tsang can be reached on (703) 305-4895. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 305-3900.

LH

lh

December 16, 2004



FAN TSANG
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600